

**10/564099**

PCT/EP2004/005135  
2003P06893WOUS PB/CBA

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**IAP20 Rec'd PCT/PTO 09 JAN 2006**

Housing, in particular housing for electronic components or the  
like

The present invention relates to a housing, in particular a housing intended to contain electric or similar components, for example mounted on a printed circuit board (PCB) or similar element.

Particularly in the electronics field, it is a known practice to use a metal housing inside which electronic components are placed on a printed circuit board. This housing comprises a cover which may, where necessary, consist of the printed circuit board. The cover is screwed onto the housing so as to close the latter reversibly. Often, the screws used are screws generating their own tapping during the screwing, such as self-tapping or self-forming screws. When they are screwed in, chips are produced and the latter fall inside the housing, the screw being inserted from the outside of the latter. The chips thus produced sometimes fall on the printed circuit board. They may then create a short circuit between the pins of the electronic components that are on the printed circuit board, or between two tracks of this circuit. Thus a chip may render an electronic device unusable.

Since the components are now implanted on the printed circuit boards increasingly close to one another, the problems of short circuits created by chips are increasingly frequent and are therefore becoming less and less acceptable.

The object of the present invention is therefore to provide a housing which, through its design, prevents a chip from reaching the printed circuit board intended to be placed inside the latter. Preferably, the proposed housing does not cost substantially more than a housing of the prior art.

Accordingly, it proposes a metal housing, particularly a

housing intended to contain electronic or similar components, comprising a side wall furnished with a ledge having a bore to receive a fixing screw.

According to the invention, the side wall has, at the bore, a recessed zone whose concavity is oriented toward the outside of the housing, the ledge intended to receive the screw overhanging the recessed zone.

With such a housing, when the screw is screwed into the ledge, the stem of the screw having traversed the ledge enters the recessed zone, outside the housing, bringing with it any chips formed during the screwing. These chips are therefore brought toward the outside of the housing and can therefore not contaminate the electronic or other components that are inside the latter.

For the external dimensions of the housing according to the invention to remain unchanged relative to a similar housing of the prior art (that is to say a housing enclosing the same components), if the side wall is substantially flat, then provision is made for the overhanging ledge not to cross the plane of the wall.

When the side wall is substantially flat, then the overhanging ledge is preferably substantially perpendicular to the plane of the wall. The screw received in the ledge then extends substantially parallel to the wall.

To make it easier to discharge the chips outside the housing and keep them away from the latter, when the side wall is substantially flat, provision is advantageously made for the recessed zone to have a surface inclined relative to the plane of the side wall so as to discharge toward the outside of the housing any chips produced by the screwing of the fixing screw. In this embodiment, the inclined surface is advantageously

connected to the overhanging ledge by a portion of wall substantially parallel to the side wall. This portion of wall parallel to the side wall is, when the fixing screw is in place, at the height of the stem of the fixing screw and is parallel to this screw stem, to the extent that the ledge is perpendicular to the side wall. This arrangement makes it possible to limit the space occupied inside the housing by the recessed zone and prevent the screw from coming to damage the wall of the recessed zone in which its stem comes to lodge.

In an embodiment of a housing according to the invention, the latter comprises a metal cap forming a cover, the electronic or similar components are supported by a printed circuit board and the peripheral edge of the printed circuit board is sandwiched between the cap and the ledge intended to receive the fixing screw, the latter traversing the printed circuit board.

Details and advantages of the present invention will better emerge from the following description, made with reference to the appended schematic drawing in which:

Figure 1 is a view in perspective of a housing according to the invention.

Figure 2 is a front view of the housing of figure 1.

Figure 3 is a view in section along the section line III-III of figure 2, and

Figure 4 shows the detail IV of figure 3 on a larger scale.

In the drawing can be recognized a housing 2 enclosed by a cap 4. This housing 2 and the corresponding cap 4 are made for example of metal sheet. Screws 6 are used to hold the cap 4 on the housing 2. Preferably use is made here of self-forming screws which allow an excellent fix without using nuts. Such

screws are designed to generate their own tapping when they are first screwed into an appropriate bore 16.

Figure 2 shows a side wall 8 of the housing 2. The cap 4 is positioned perpendicularly to this side wall 8. At each screw 6, the side wall 8 has a recessed zone 10. This recessed zone 10 has a two-part bottom. A first part 12 is substantially parallel to the side wall 8. This first part 12 is on the side of the corresponding screw 6 and extends over a height substantially equal to the length of the stem of the screw 6 having traversed the bore 16 supporting the self-forming screw 6. The second part 14 of the bottom of the recessed zone 10 is substantially flat. It connects the side wall 8 to the first part 12, parallel to the side wall 8 but offset relative to the latter toward the inside of the housing 2. This second part 14 of the bottom of the recessed zone 10 thus forms an inclined plane which penetrates progressively toward the inside of the housing 2 as it gets nearer to the self-forming screw 6.

The bottom of the recessed zone 10 is also connected to the side wall 8 by connecting faces 18. The latter may be substantially perpendicular to the side wall 8 or, as shown in the drawing, may themselves also be inclined, the recessed zone 10 then looking like a dish.

The remainder of the description assumes that the housing 2 is disposed so that the side wall 8 is in a substantially vertical position and that the cap 4 is disposed substantially horizontally on the top of the housing 2.

The recessed zone is overhung by a ledge 20 substantially perpendicular to the side wall 8. This ledge 20 is attached to the first part 12 of the bottom of the recessed zone 10 and forms a right angle with the latter. This ledge 20 supports the bore 16 receiving the self-forming screw 6. The ledge 20 thus forms, on the top of the housing 2, a bearing surface for the

cap 4. In the embodiment shown in the drawing, it is noted that a printed circuit board 22 is sandwiched between the ledge 20 and the cap 4. This printed circuit board 22 supports electronic components not shown in the drawing.

When this housing 2 is assembled, the printed circuit board 22 is placed on the top of the housing 2 and is then covered by the cap 4. Bores facing the bores 16 of the ledges 20 of the housing 2 are provided in the printed circuit board 22 and in the cap 4. These bores made in the cap 4 and the printed circuit board 22 have a larger diameter than the diameter of the stem of the screw 6. During assembly, the screw 6 therefore traverses these bores and is stopped at the bore 16 whose initial diameter is less than the diameter of the stem of the screw 6. By screwing, the screw taps the bore 16 and forms a tapped column allowing the coupling of the screw 6. During the formation of this column, metal chips are usually formed. These chips then fall by gravity onto the second part 14 of the bottom of the recessed zone 10. This second part 14 then forms a chute discharging the chips thus formed. These chips no longer risk coming to create short circuits inside the housing 2.

In this embodiment, the stems of screws 6 are outside the housing. However, compared with a similar housing of the prior art, the external dimensions of the housing do not vary. The cost price of a housing according to the invention is substantially the same as that of a housing of the prior art. The housing according to the invention therefore makes it possible, without extra cost, to reliably prevent the problems of short circuits (or other electrical problems) due to chips falling on a printed circuit board or close to a component.

The present invention is not limited to the preferred embodiment described hereinabove as a nonlimiting example. It also relates to all the variant embodiments within the scope of

those skilled in the art in the context of the following claims.

Thus, the shapes, equally of the housing, its cap and the recessed zone may be modified without departing from the context of the invention.

The assembly of the printed circuit board as a sandwich between the ledge of the housing and the cap is optional. It is possible for example to make provision to attach the cap directly to the housing. It can also be envisaged that the printed circuit board forms the cap of the housing. The fixing screws may also be used to attach elements other than a cover, cap or similar element.